

STREPTANTHUS LONGISILIQUS (BRASSICACEAE), A NEW SPECIES FROM NORTHEASTERN CALIFORNIA

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ABSTRACT

Streptanthus longisiliqus G. Clifton & R. Buck is described as a new species from Butte, Tehama, and Shasta counties in northeastern California. The new species is a short-lived perennial in subgenus *Pleiocardia*, informal group Cordati. Based on several morphological characters, *S. longisiliqus* appears to be most closely related to the montane southern California species *S. bernardinus* and *S. campestris*; it is geographically disjunct from those taxa by approximately 600 km. *Streptanthus longisiliqus* occurs in montane coniferous forest, often in localized openings, and sometimes in disturbed places.

Key Words: Brassicaceae, Butte County, California, new species, *Pleiocardia*, Shasta County, *Streptanthus*, Tehama County.

In 1974, the senior author discovered a *Streptanthus* south of Stirling City in Butte County, California, which could not be satisfactorily identified as any previously described species in the genus. The same taxon was discovered in 1989 at several locations in northern Shasta County in the course of special-status plant surveys along the route of a proposed electric transmission line. A subsequent survey of several herbaria located a number of additional previous collections of this taxon. This *Streptanthus* was first collected by Milo Baker in eastern Shasta County in 1898 (Baker 413 UC). Jepson (1936) cited this specimen as *S. cordatus* Nutt., noting its arcuate fruits, in contrast to the generally straight fruits of *S. cordatus*. A 1967 collection by Arthur Kruckeberg (Kruckeberg 6042 WTU) and several collections by Robert Preston and others at CHSC, collected between 1980 and 1988, documented additional localities in eastern Tehama and eastern Butte counties. The Kruckeberg collection and the collections at CHSC were determined as *S. cordatus* but, like the Baker collection, are substantially different from typical *S. cordatus*. The taxon was noted as an undescribed species in the Butte County flora (Oswald and Ahart 1994) and in the Jepson Manual treatment of *Streptanthus* (Buck et al. 1993).

In a study of seed glucosinolates in *Streptanthus* species, Rodman et al. (1981) cited the Kruckeberg collection as *S. cordatus* var. *crassifolius*, a name that has apparently never been validly published, based on *Streptanthus crassifolius* Greene. Greene (1897: 227–228) proposed the name *S. crassifolius* to encompass plants from eastern California, Nevada, Arizona, and western Utah that are recognized today as *S. cordatus* var. *cordatus*, restricting *S. cordatus* to plants from Wyoming and eastern Utah. Although Greene did not cite specimens, it is clear that

his concept of *S. crassifolius* does not apply to the northeastern California plants herein described as a new species.

The seed glucosinolate profile for Kruckeberg 6042 differed from the profiles determined for other *S. cordatus* accessions (Rodman et al. 1981), which supports our comparative field and herbarium studies that indicate that this northeastern California taxon is not a form of *S. cordatus*. It is more closely related to *S. campestris* S. Watson and *S. bernardinus* Parish, two species occurring in the Transverse and Peninsular Ranges of southern California. Although all three taxa show morphological similarities, the northeastern California taxon, here described as *Streptanthus longisiliqus* sp. nov., consistently differs in several respects from the two southern California species (Table 1). Its southern range limit is approximately 600 km NNW of the northern limits of the two southern California species.

SPECIES TREATMENT

Streptanthus longisiliqus G. Clifton & R. Buck sp. nov. (Fig. 1)—TYPE: USA, California: Butte Co., ±0.8 km north of Robley Point, growing on a steep road bank, 39°52'21"N, 121°31'06"W; T23N R4E S10, NW 1/4 of NW 1/4, 13 June 1997, G. Clifton 35529 (holotype, JEPS; isotypes, CAS, CHSC, PUA, MO, NY, RSA).

Differt a *S. campestris* S. Watson foliis mediis et superis caulinis ovatis vel suborbicularibus, generatim integris, et petiolis foliorum basilarium et infernorum caulinarum generatim glabris.

Short-lived perennial from persistent woody taproot or slender caudex; herbage glabrous, glaucous. Stems 1 to rarely several, erect or ascending, simple or branched above, 3–15 dm

TABLE 1. MORPHOLOGICAL COMPARISON OF *STREPTANTHUS LONGISILIQUUS*, *S. CAMPESTRIS*, *S. BERNARDINUS*, AND *S. CORDATUS* VAR. *CORDATUS*. Some data are from Buck et al. (1993).

Character	<i>S. longisiliquus</i>	<i>S. campestris</i>	<i>S. bernardinus</i>	<i>S. cordatus</i> var. <i>cordatus</i>
Plant height	6–15 dm	3–15 dm	3–6 dm	2–6 dm
Petiole pubescence	Generally glabrous	Generally ciliate	Generally glabrous	Glabrous or ciliate
Middle, upper cauline leaf	Ovate to suborbicular, generally entire	Lanceolate to lance-oblong, entire to dentate	Lanceolate to lance-oblong, generally entire	Lanceolate to broadly ovate, generally entire
Sepal color	Yellow-green proximally, purple distally	Purple	Light yellow to white	Generally purple
Petal color	Yellow-green proximally, purple distally, especially on veins	Light yellow proximally, light purple distally	Light yellow to white	Purple
Siliqua shape	Arcuate	Arcuate	Arcuate	Generally straight
Siliqua dimensions	To 15 cm long, \pm 2 mm wide	6–14 cm long, 2.5–3.5 mm wide	5–8 cm long, 1.5–2 mm wide	5–8 cm long, 2.5–6 mm wide

high. Basal leaves in rosettes; basal and lowermost cauline leaves petioled, elliptic to suborbicular, obtuse, cuneate at base, blades 1–5.5 cm long, usually dentate with callus-tipped teeth, less commonly entire; cauline leaves to 14 cm long, gradually reduced upward, generally entire or nearly so (the lower occasionally dentate), the lower oblanceolate to broadly strap-shaped, with a winged petiole \pm clasping the stem, the middle and upper broadly ovate or broadly oblong to suborbicular, sessile, broadly amplexicaul, the tip often bluntly apiculate with a setose hair. Inflorescence ebracteate, at first dense, becoming lax, simple to rarely branched, 3–7 dm long, pedicels divergent-ascending, thin to stout in fruit, 4–10 mm long. Sepals narrowly oblong, not keeled, 6–8 mm long, lower 2/3 yellow-green, upper 1/3 purple, scarious-margined distally or throughout, with a tuft of simple, stout, broad-based trichomes just below tip. Petals narrowly linear-spatulate with tip \pm acuminate, 10–12 mm long, channeled, not or scarcely crisped, claw \pm spatulate-oblanceolate, wider than blade, with constriction at junction, blade scarious-margined, bottom 2/3 yellow green and upper 1/3 purplish especially on veins, the upper two petals recurved. Filaments all free, in three pairs of unequal length, the anthers of the longest (adaxial) pair somewhat reduced. Style 1.5–3.5 mm long; stigma \pm entire. Siliques \pm spreading, weakly to very strongly arcuate, strongly flattened parallel to the replum, \pm 2 mm wide, up to 15 cm long. Seeds brown, orbicular to ovate or oblong, compressed, narrowly wing-margined, 2–3 mm long; cotyledons accumbent.

Paratypes. USA, California: Butte Co.: ca. 4 km SSW of Big Bar Mtn. on N side of Forest Service Rd. 22N84, T22N R5E SW1/4 of NW1/4

S20, 1006 m, 6 July 1993, B. Castro et. al. 465 (CHSC, UC); 4 km S of Stirling City, 1100 m, 17 September 1983, L. Ahart 4434 (CHSC, MO); north of Cohasset near county line, T24N R2E NE 1/4 S1, 1097 m, 11 June 1981, R. A. Schisling 4085a (CHSC); NW side of canyon of Cedar Ck., 6.6 km E of Lomo along the "Cedar Loop", T25N R3E SE 1/4 S11, 1280 m, 14 June 1988, L. P. Janeway 2791 (CHSC); on Carpenter Ridge, ca. 3.2 km SW of Butte Meadows, T25N R3E NW 1/4 S1, 1340 m, 11 June 1981, R. E. Preston 83 (CHSC); near Humboldt Rd., ca. 5 km SW of Butte Meadows, 1450 m, 16 August 1983, L. Ahart 4283 (CHSC, MO); on side of Old Humboldt Rd., ca. 1.4 km W of Butte Meadows Forestry Station, 1341 m, 6 July 1980, M. S. Taylor 3074 (CHSC); Tehama Co.: on roadbanks along Hwy. 32 ca. 4.8 km E of Soda Springs Rd. and 16 km E of Lomo, 8 September 1967, A. Kruckeberg 6042 (WTU); along CA Hwy. 32, ca. 5.5 air km NNW of Butte Meadows, T27N R3E bdy. NW, NE1/4 of NE1/4 S36, 1189 m, 3 October 1989, R. E. Buck 1414 (UC); Shasta Co.: Tamarack Road near summit, 9 July 1898, M. S. Baker 413 (UC); N side of Bluejay Mtn. along rd. to Hogback Mtn. lookout, T35N R1W SE1/4 of SW1/4 S18, 884 m, 4 October 1989, R. E. Buck 1415 (UC); along dirt rd., W-facing slope just below ridgetop on E side of Stump Ck. cyn, T37N R1W NE1/4 of SE1/4 S11, 716 m, 25 June 1987, R. E. Buck et. al. 711 (UC); upper W-facing slope just below saddle bet. Stump Ck. Butte summit and hill to S, T37N R1W NE1/4 of SE1/4 S3, 1173 m, 24 June 1988, R. E. Buck & R. Palmer 1016 (UC).

DISTRIBUTION AND HABITAT

Streptanthus longisiliquus occurs on the western slope of the extreme northern Sierra Nevada in

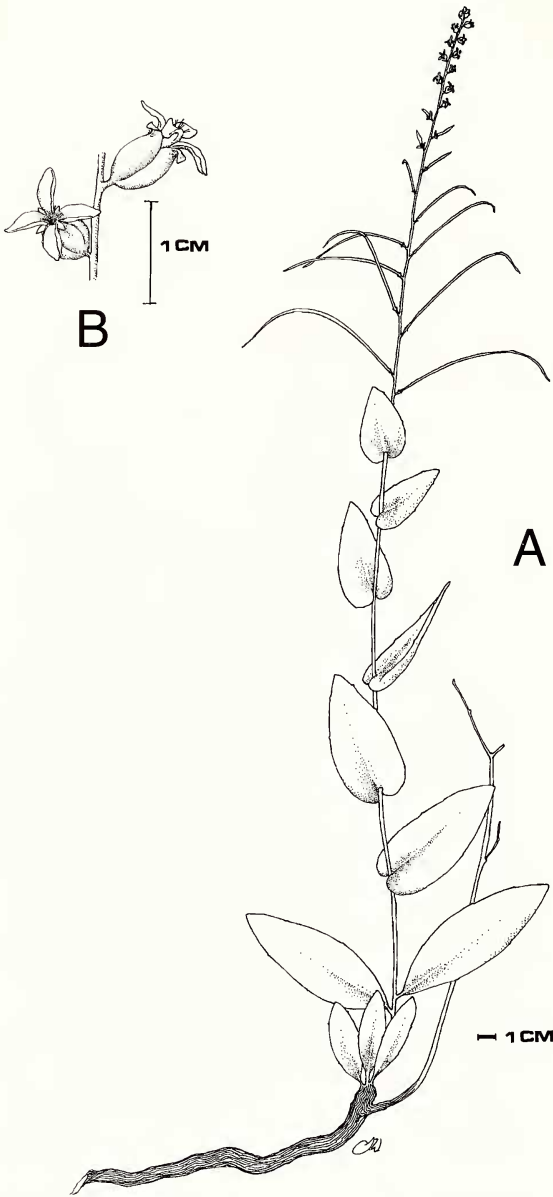


FIG. 1. *Streptanthus longisiliques*. A) Habit, with flowers and immature fruits; B) Flowers.

eastern Butte and Tehama Cos., California, and in the eastern Klamath Mountains/extreme southern Cascade Range border region to the north in central Shasta Co., California (Fig. 2). It occurs at elevations from 715 to 1500 m. It does not seem to have any substrate preferences, occurring on a variety of igneous, sedimentary, and metamorphic substrates. Within its range, it appears to be relatively uncommon and sporadically distributed, with widely scattered, localized populations seldom containing more than 100 plants, and often with less than 50. The species appears to be absent from most of the apparently suitable habitat within its range.

Streptanthus longisiliques generally occurs in lower montane coniferous forest, typically dominated by such tree species as *Pinus ponderosa* Douglas ex P. & C. Lawson, *Calocedrus decurrens* (Torr.) Florin, *Pseudotsuga menziesii* (Mirbel) Franco, *Quercus chrysolepis* Liebm., and *Quercus kelloggii* Newberry. At one location on Bluejay Mountain in Shasta Co., the species occurs in an extensive forest overwhelmingly dominated by *Q. kelloggii*. It generally occurs in localized openings within the forest. The species is tolerant of some disturbance and may be favored by it. It often occurs in some numbers on roadcuts, and it is sometimes observed to be relatively abundant on roadcuts and rare but widely scattered in the surrounding undisturbed forest.

Associated shrubs include *Ceanothus integerrimus* Hook. & Arn., *Toxicodendron diversilobum* (Torr. & Gray) Greene, and *Symphoricarpos mollis* Nutt. Associated subshrubs and herbs include *Chamaebatia foliolosa* Benth., *Eriogonum nudum* Dougl. ex Benth., *Osmorhiza chilensis* Hook. & Arn., *Malacothrix floccifera* (DC.) Blake, *Eriophyllum lanatum* (Pursh) Forbes, and *Melica harfordii* Boland.

TAXONOMIC RELATIONSHIPS

Streptanthus longisiliques is a member of subgenus *Pleiocardia* (Greene) Jepson, which encompasses mostly biennial to perennial species occurring in the western United States (west of the Rocky Mountains) and adjacent northern Mexico, with stamens free to the base and the anthers of the adaxial stamen pair the same size as those of the other two pairs of stamens or somewhat reduced ($>1/2$ the length). The more specialized subgenus *Euclesia*, the other subgenus occurring in western North America, consists of mostly annual species with the filaments of the adaxial stamen pair partially to completely connate and the anthers greatly reduced and often sterile (Kruckeberg and Morrison 1983). Within subgenus *Pleiocardia*, Rodman et al. (1981) informally recognized two groups, Cordati and Tortuosi. *Streptanthus longisiliques* clearly falls within Cordati, characterized by an ebracteate inflorescence, cauline leaves generally strongly reduced upwards (except in *S. barbatus* S. Watson), and sepal tips generally bristly with stout, broad-based trichomes (except in *S. howellii* S. Watson).

Within the informal group Cordati, *S. longisiliques* appears to be most closely related to *S. campestris* and *S. bernardinus*. These three species are distinguished from other members of the informal group Cordati by their similarity in habit and by their strongly arcuate fruits. Table 1 compares the three species morphologically, and also includes *S. cordatus* var. *cordatus*, since some previous collections of *S. longisiliques* have been

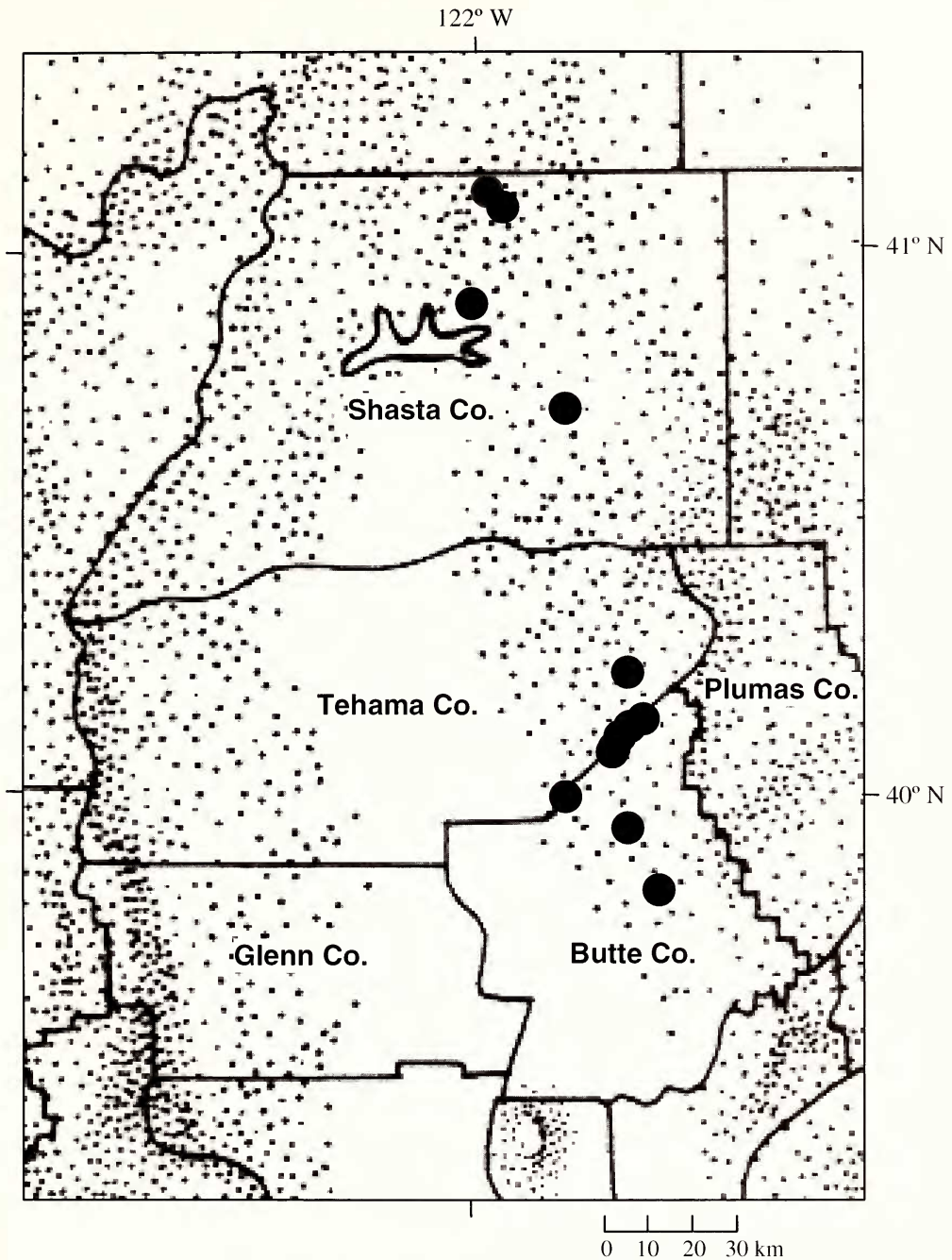


FIG. 2. Distribution of *Streptanthus longisiliquus* in northeastern California.

identified as that taxon. Most other members of Cordati have the fruits straight or only slightly arcuate. *S. barbatus* S. Watson also sometimes has strongly arcuate fruits, but that species is readily distinguished from the former three species by its broadly ovate to orbicular, more or less overlapping cauline leaves that are scarcely reduced upward, as well as by its generally more erect, less branched habit. *Streptanthus long-*

isiliquus, *S. campestris*, and *S. bernardinus* also occur in similar habitats. The montane coniferous forests in which *S. longisiliquus* occurs are northern analogues of the southern California montane coniferous forests in which the former two species occur and contain many species in common with them.

Streptanthus bernardinus is the most distinctive of the three arcuate-fruited species because of its

yellow sepals and petals and generally smaller stature (stems <7 dm high; *S. campestris* and *S. longisiliquis* to 15 dm). *Streptanthus longisiliquis* closely resembles *S. campestris* in most respects, differing in its ovate to suborbicular, generally entire middle and upper cauline leaves and generally glabrous petioles of the basal and lower cauline leaves. In *S. campestris*, the middle and upper cauline leaves are lanceolate to lance-oblong and entire to dentate, and the petioles (and, often, the leaf margins) of the basal and lower cauline leaves are generally ciliate.

RARITY AND CONSERVATION STATUS

Streptanthus longisiliquis is a species of limited distribution; it occurs in only three counties, and its range extends only approximately 160 km north-south. Within its range, it is uncommon and sporadic in its occurrence. Although some populations are along well-traveled roads, many of the known localities are remote. The species is somewhat tolerant of disturbances, such as grading and excavating, and may even be favored by such disturbances if they are localized. However, logging activities and off-road vehicles constitute potential threats to the species.

Given the distribution of *S. longisiliquis*, the remoteness of many of the known localities, the species' tolerance of disturbance, and the nature and level of potential threats to the species, *S. longisiliquis* should not be considered endangered at present. However, the species is uncommon enough that its status should be monitored. We recommend that *S. longisiliquis* be considered for inclusion on List 4 (Plants of Limited Distribution—A Watch List) of the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants of California (CNPS 2001).

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